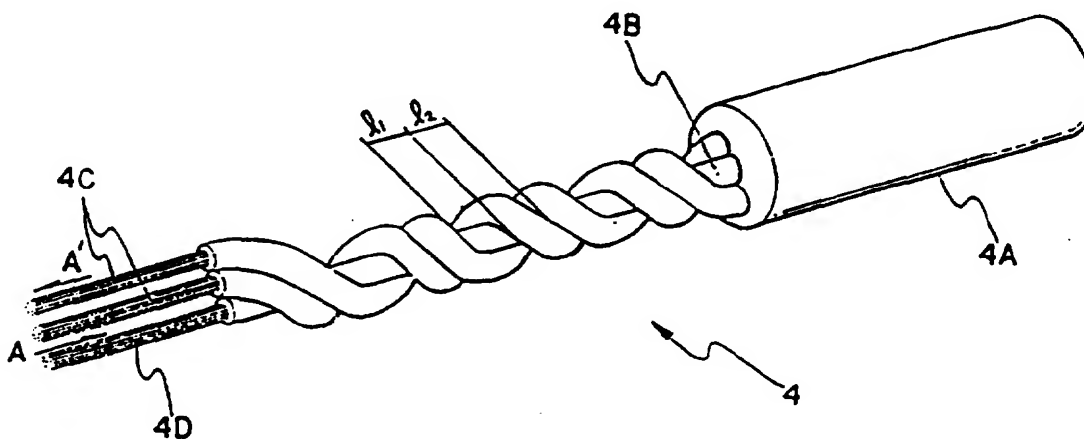




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| (21) International Application Number: PCT/US96/15748 (22) International Filing Date: 7 October 1996 (07.10.96) (30) Priority Data: 08/554,703 7 November 1995 (07.11.95) US (71)(72) Applicant and Inventor: PAK, Il, Young [US/US]; 2257 Country Canyon Road, Hacienda Heights, CA 91745 (US). | | (81) Designated States: CN, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> |

(54) Title: CORD AND HEATING WIRE**(57) Abstract**

The present invention relates to an arrangement of the electric cord (4) for offsetting or neutralizing electromagnetic wave generating from a pair of annealed copper wire (4C) or nichrome wire. In a preferred form, this invention provides an electric cord (4) of tubular form having two insulated conductors (4C) which are wound in the same direction along the third conductor (4D) and are arranged such that the twisted interval of both conductors corresponds to the sum of the diameter of the two conductors, thereby, when electric current is supplied to each of the conductors in an opposite direction, offsetting the electromagnetic wave of field generating from each of the conductors.

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CORD AND HEATING WIRE

Field of the Invention

The present invention relates to an electric cord and heater wire generating no any electromagnetic wave and more particularly, to the electric device cord and heater wire, designed to eliminate any adverse effects of said electromagnetic wave, in such a fabrication to offset and prevent the electromagnetic wave, generated from an annealed copper or nichrome wire consisting of an electric cord.

Description of the Prior Art

Generally, when an alternating current flows through a heater wire or annealed copper wires, electric flux, being crossed magnetic flux generated around the annealed copper or heater wire, is generated, as shown in Figure 1 and 2; in other words, when the current flows through the wire, the electromagnetic wave is produced by an electric field and magnetic field associated with the current.

The electromagnetic wave is a phenomenon in which the constant energy wave is transmitted in one point of electromagnetic field having the electric and magnetic natures. The electromagnetic wave is expressed by mG, a measurement unit of electromagnetic field and it is referred to as "electromagnetic field (EMF) or "electromagnetic wave(EMW)."

The electromagnetic wave may be described in more detail by

referring to Figure 1 or 2; When the current flows through a heater wire 1 toward the direction "A", the electromagnetic wave is generated in the direction of "B", thus giving off larger electromagnetic wave around the heater wire 1.

As illustrated in Figure 2, when the current flows in the direction of A and A' with the flat electric cord 2 tightly closed, the electromagnetic wave is generated in the opposite direction of B and B'. Since the annealed copper wire 2A and 2A', a deep line of said flat electric cord 2, is closely located each other, the electromagnetic wave generated from the central point of both annealed copper wire 2A and annealed copper wire 2' is mutually duplicated and offsetted.

On the other hand, since the electromagnetic wave giving off from each of the annealed copper wire, distanced from the central point, is not duplicated, the occurrence of the electromagnetic wave in the opposite direction each other the electromagnetic wave may bring about adverse effects to the body in the long run.

The electromagnetic wave is said to have been already harmful to the body through the public campaign of mass media such as newspaper, TV, books, etc. In addition, it has been well known that compared with inhabitants in other areas, those people residing in the area with a high-voltage electric wire have a higher incidence in cancer or leukemia. Should the human body be exposed to the electromagnetic wave for a prolonged period, there is a big possibility that the electromagnetic wave may cause the following fatal diseases: cancer, diabetes, leukemia, cerebral hemorrhage, schizophrenia, infertility, abortion, neonate with congenital malformation, and children's

malfunctioning, etc.

Presently, the electromagnetic waves have been generated from some household-utilized electric devices such as electric blanket, electric plate, electric cushion and electric foment, which are directed contacted with the human bodies. If said electric devices are used for a prolonged time, there may be a great risk of being exposed to the electromagnetic waves, thus inducing cancers and leukemia.

In particular, in case of electric devices such as blanket and electric plate, the electromagnetic wave ranging from 33 to 100mG is generated and this level is very fatal to the body, in view of the fact that even 1mG is harmful to the body.

Summary of the Invention

This invention is designed to eliminate any adverse effects given to the body by offsetting the electromagnetic wave generated from the aforementioned general electric device cord and heater wire. Thus, the main object of this invention is to protect the body by adapting the electromagnetic wave to electric devices (e.g., electric plate which is directly contacted to the body), a daily-necessary refrigerator and micro-oven.

To fulfil the aforementioned assignment, This invention is characterized by the following embodiment: When the current flows through the annealed copper wire where two soft annealed copper wires twisted are, the electromagnetic waves generated from each annealed copper wire is offsetted and prevented.

When the three-wire electric cord having high electric voltage is

applied, the flat annealed copper wire is wound in the same direction to one-wire soft wire for ground connection and when the current flows, the electromagnetic wave generated from each annealed copper wire is offsetted and prevented.

Further, when the general heater wire is applied, the circumference of annealed copper wire is coated with an inner coating material having having Teflon, while the circumference of the inner coating material is wound with nichrome or alloy wire, followed by an outer coating material having Teflon. With such fabrication, the structure may be utilized at the maximum permissible temperature of 280°C and when a heat by the current is generated from the annealed copper and nichrome wire, the electromagnetic wave generated from each annealed copper wire is offsetted and prevented.

In addition, when a heater wire with a high heat (high temperature), circumference of nichrome wire, a deep wire, is coated with an outer coating material having ceramic or glass fiber and then, the circumference of said outer coating material is wound by nichrome wire; the current flows through each of nichrome wire, thus generating two-fold heat and the electromagnetic wave generated from two nichrome wire is offsetted and prevented.

Brief Description of the Drawings

The above object and other advantages of the present invention will become more apparent by describing in detail the preferred embodiment of the present invention with reference to the attached drawings in which :

Figure 1 is a reference view of the generation and direction of the electromagnetic wave when current flows through conventional electric wire;

Figure 2 is a reference view of the generation and direction of the electromagnetic wave when current flows through conventional flat pair cable;

Figure 3 is an illustration of the twisted two wire cable embodying the present invention;

Figure 4 is an illustration of the twisted three wire cable embodying the present invention;

Figure 5 is an elevation of the low power heater wire arranged according to the principle of this invention; and

Figure 6 is an elevation of the high power heater wire arranged according to the principle of this invention.

DETAILED DESCRIPTION OF THE INVENTION

Preferred Embodiment

Referring to FIG. 3, two soft annealed copper wires, which is insulated, are twisted and buried in the tubular cover. At each soft annealed copper wire current flows in opposite direction so that one soft annealed copper wire absorbs electromagnetic waves occurring from each other. Thus, the electromagnetic waves generating in the electric cord can be offsetted or considerably reduced.

In the above, depth of soft annealed copper wire is proportioned to sum of thickness of two soft annealed copper wire. If soft annealed copper wire twisted very tightly, electromagnetic wave much lessen.

In this embodiment, a soft annealed wires are twisted each other, current flows in the opposite direction, as electromagnetic wave from soft annealed copper wire turn as the direction twisted.

Because it is duplicated and offset each other that in an opposite direction of electromagnetic wave generating from center of an annealed copper wire, it is reduced that electromagnetic wave spreading from the center of an annealed copper wire.

In the drawing, 3A represents outer coating materials which is composed of P.V.C, and 3B inner coating materials also composed of P.V.C.

As is explained above, if present invention is applied to lamp, audio, television, electric blanket, electric fomentor, etc. generally used to, two wires of electric cord reduce electromagnetic wave so that it can protect human body from the EMW or EMF.

the Second Embodiment

Referring to FIG. 4, two pieces of soft annealed copper wire wind in the same direction of the center of a soft annealed copper wire, current is flew through each soft annealed copper wire, soft annealed copper wire, width of the soft annealed copper wire, and diameter of soft annealed copper wire is same at the size.

In the above, purpose of winding soft annealed copper wire in the same direction with ground-connected annealed copper wire in the center is for being near between first annealed copper wire and second annealed copper wire. Because long distance between first annealed copper wire and second annealed copper wire reduces bad effects from electromagnetic wave.

Especially, for annealed copper wire, intervals of that, diameter of that is same size, minimizing intervals above leads for electromagnetic wave being duplicated.

Furthermore, as each electromagnetic wave from soft annealed copper wire is duplicated, soft annealed copper wire is twisted in the same direction, keep at uniform intervals, spreading electromagnetic wave is turned and rotated, and duplicated each other. For this reason, electromagnetic wave is offsetted each other.

4A in Fig. 4 is outer coating materials composed of P.V.C, 4B is inner coating materials composed of P.V.C.

Three wires of electric cord reducing electromagnetic wave can protect human body by application electric device for electric capacitance and ground connected wire such needed as micro oven, a freezer, etc.

the Third Embodiment

Referring to FIG. 5, a flame-resisting material is coated on circumference surface of annealed copper wire by discontinuous twisted wire, and is wound by nichrome wire or a compound metal wire in a regular intervals on the surface of inner coating materials.

Outer coating materials is covered on the circumference of nichrome wire above.

Electric current may flows through annealed copper wire and nichrome wire in a opposite direction from each other.

As is explained above, distance of nichrome wire is proportion to sum of diameter of soft annealed copper wire and discontinuous twisted wire.

Though these temperature of heating wire increase to 280°C by inner coating materials and outer coating materials composed of silicon rubber, annealed copper wire and nichrome wire is shorted each other electrically.

Thus, electric spark is excluded between annealed copper wire and nichrome wire, especially, as above annealed and nichrome wire flows in opposite direction each other, electromagnetic wave from annealed wire and nichrome wire is absorbed and offsetted each other. Consequently, electromagnetic wave is not generated.

That is, electromagnetic wave from annealed copper wire above is generated from the center of annealed copper wire, it is spreaded on inner coating materials.

Meanwhile, electromagnetic wave of nichrome wire wounded on inner coating materials is generated in the opposite direction of annealed copper wire.

And so, electromagnetic wave of annealed copper wire and nichrome wire are absorbed and setoff each other, especially, because nichrome copper wire wind with keeping a regular intervals to inner coating materials, electromagnetic wave of annealed copper wire easily is duplicated and setoff each other to electromagnetic wave generated from nichrome copper wire and turn to winding direction, these electromagnetic wave is reduced very effectively.

These heating wire can protect human body from electromagnetic wave generated from electric blanket, electric bed, electric carpet, electric tormenter, etc used to temperature of below 100°C.

the Fourth Embodiment

Referring to FIG. 6, on circumference surface of nichrome wire or a compound metal wire, outer coating materials composed of ceramic or glass

are coated. As on circumference surface of outer coating materials nichrome wire is wound in a regular intervals, twice temperature heating is generated, and each nichrome wire is absorbed and sectored. And so, electromagnetic wave is not generated.

Because it reduces generation of electromagnetic wave by the same principle as to the third embodiment, the explanation therefor will be omitted.

For these reason, heating wire explained above can protect human body from electromagnetic wave applied in a electric heater or hair dryer which needed high heats more than 100°C.

As is explained above, device of present invention can protect human body from electromagnetic wave generated from electric cord and heater wire of hair dryer, and so prevent cancer, leukemia, etc previously.

What is claimed is :

1. In an electric cord of tubular form having two insulated conductors buried therein, wherein said insulated conductors are twisted along said tubular cord and are arranged such that the twisted interval of both conductors corresponds to the sum of diameter of said two conductors, thereby, when electric current is supplied to each of said conductors in an opposite direction, offsetting the electromagnetic wave or field generating from each of said conductors.
2. In an electric cord of tubular form having three insulated conductors buried therein, wherein two of said insulated conductors are wound in a same direction along the remainder in said tubular cord and are arranged such that the interval of said both conductors corresponds to the diameter of one conductors, thereby, when electric current is supplied to each of said two conductors in an opposite direction, offsetting the electromagnetic wave or field generating from each of said two conductors.
3. An electric heater wire of tubular form including; an core conductor covered with a flame-resisting materials; an inner cover made of Teflon* wound around said core conductors; a nichrome wire wound around and along said inner cover; and an outer cover made of silicon material covering onto said nichrome wire; thereby, when electric current is supplied to said core conductor and said nichrome wire in an oppsite direction, offsetting the electromagnetic wave or field generating from each of said two conductors.

4. An electric heater wire of tubular form including; a core conductor covered with ceramic materials; a nichrome wire wound around in a same pitch along said ceramic cover; thereby, when electric current is supplied to said core conductor and said nichrome wire in an oppsite direction, offsetting the electromagnetic wave or field generating from each of said two conductors.

FIG. 1

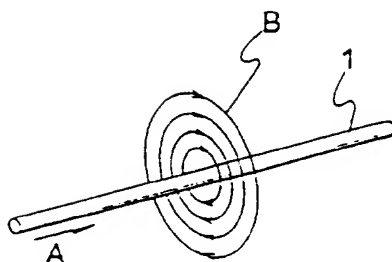


FIG. 2

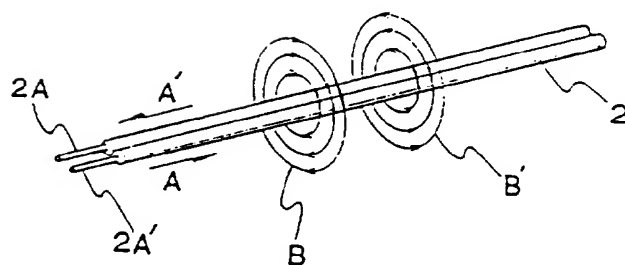


FIG. 3

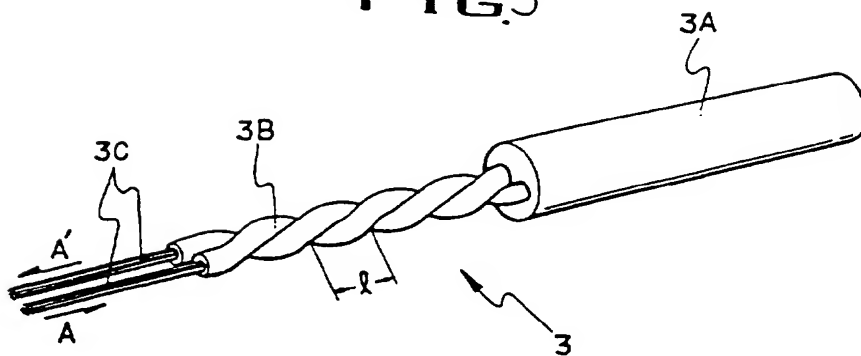


FIG. 4

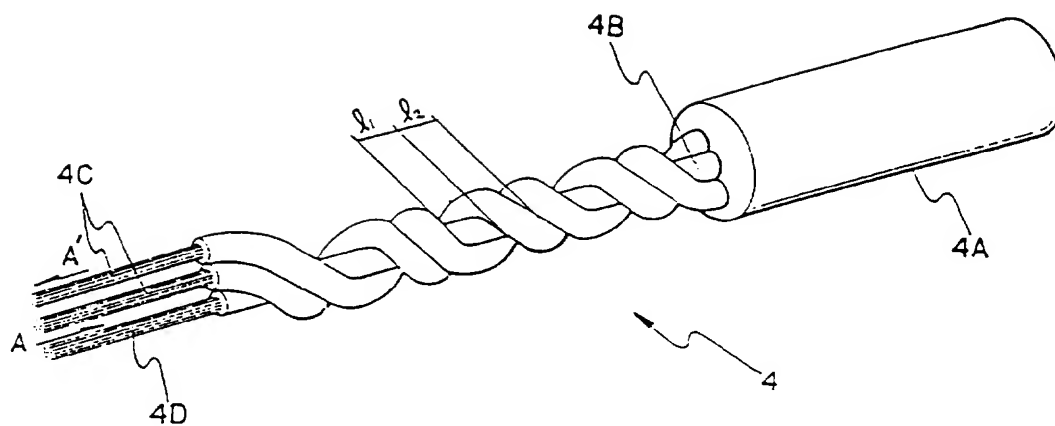


FIG. 5

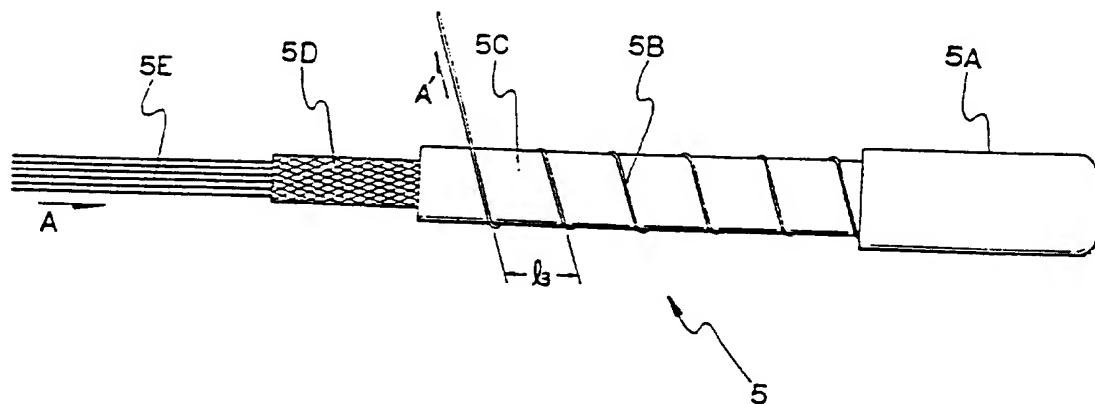
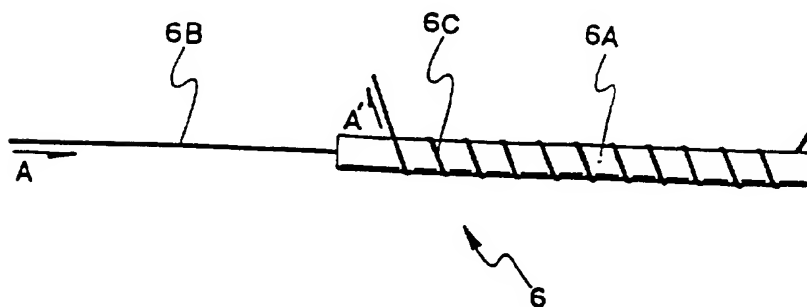


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US96/15748

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H01B 11/04

US CL : 174/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 174/34, 36, 113R; 310/213; 336/187

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, search terms: twist length, twist lay, electromagnetic.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| Y | US 4,873,393 A (FRIESEN et al.) 10 October 1989, Col.1, lines 63-68 | 1-2 |
| Y | US 5,424,491 A (WALLING et al.) 13 June 1995, the abstract | 1-2 |
| Y | US 4,945,189 A (PALMER) 31 July 1990, Figure 2 | 2 |
| Y | US 5,493,071 A (NEWMAYER) 20 February 1996, Figure 1 | 1 |
| A | US 5,010,210 A (SIDI et al.) 23 April 1991 | 1-2 |
| A | US 4,754,102 A (DZURAK) 28 June 1988 | 1-2 |
| A | US 5,298,680 A (KENNY) 29 March 1994 | 1-2 |



Further documents are listed in the continuation of Box C.



See patent family annex.

| | |
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| * Special categories of cited documents: | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
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Date of the actual completion of the international search

21 JANUARY 1997

Date of mailing of the international search report

25 FEB 1997

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/15748

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| A | US 2,386,753 A (SHIELD) 16 October 1945 | 1-2 |
| A | US 4,697,051 A (BEGGS et al.) 29 September 1987 | 1-2 |
| A | US 0,240,433 A (LUGO) 19 April 1881 | 2 |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US96/15748

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1 and 2

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.